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East Europe Report

SCIENTIFIC AFFAIRS

No. 746

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CONTENTS

COMPUTER SYSTEMS DEVELOPMENT OUTLINED

Prague VYBER INFORMACI Z ORGANIZACNI A VYPOCETNI TECHNIKY in Czech No 1 1982 pp 3-7

[Article by Eng Ivan Malec, Federal Ministry of the Electrotechnical Industry: "Development of Computer Systems and Implementation of Automated Systems of Management"; portions within slantlines in boldface]

[Text] Historical Abstract

An analysis of the state and utilization of computer technology in the national economy for the year 1971, published in 1972 by the Federal Bureau of Statistics, states on p 7 that the first four computers in the CSSR were installed in 1960 (classified in the category of "small" computers). The first generation of computers still could not be efficiently used for automation of management processes. The design of computers of that generation was adapted primarily to handling scientific and technical calculations (among the first computers installed in the CSSR were ZUSE computers, whose designer, Mr Zuse, was himself a civil engineer and designed them primarily for handling static calculations) and, as it soon turned out, they lacked external memories with direct access. For that reason, soon the worldwide trend became development of computers of the second generation, the design of which already made it suited for so-called "mass data processing" and came equipped with disk memories (e.g., the IBM 1410 computer supplied in 1967 for the Office Machinery--Inorga enterprise). Thus, the design for "mass data processing" was technically more demanding. It must be stated, however, that /development of disk memories in the subsequent years in capitalist countries kept pace with the capacity of the systems and that users in the West did not perceive equipping computers with those types of memory as a problem. In the CSSR, deliveries of disk memories are still a limiting factor for development of computer technology applications, particularly applications for purposes of management/ (limitations in importation of large-capacity and even medium-capacity disk units from Bulgaria, e.g., limits in the Seventh Five-Year Plan production of our JSEP [Uniform System of Electronic Computers] systems and deliveries of the SMEP [System of Small Electronic Computers] systems, especially since NATO countries also included limitation of disk capacities into their licensing conditions).

The problems of implementation of automated systems of management became topical in connection with comprehensive overhaul of the automobile plant in

Mlada Boleslav. At that time, the world's automobile industry still stood at the head of computer applications--technically and methodologically. It pioneered the way for new systems of semiautomated data acquisition and distribution, as well as for systems for their processing. For all practical purposes, the most efficient user systems were installed in the automobile industry. An impetus for control and legislative regulation of the implementation of automated systems of management was provided by some personnel of the then Projekta and Kovotechna plants. The proposed topic was then taken up through the initiative of the then State Commission for Management and Organization at the Presidium of the CSSR Government. The fact that the impetus originated from Projekta, i.e., a civil engineering technological design and planning institute, left its mark also on the orientation of how it was dealt with: /the concept was taken up as a part of an amendatory decree regarding design and planning documentation of construction projects/ (obviously justified for two reasons: on the one hand, due to increasing demand for capital investments and, on the other hand, due to direct dependency of operational management on the installed technology; in the above-mentioned automobile plant, considerations regarding automation of management led to considerable demand for investments, i.e., up to 15 percent of total expenditures).

Successful dealing with and solving the problem in the above-described manner, i.e., tying in implementation of automated systems of management with construction of new and comprehensive overhaul of extant plants encountered two obstacles in the mid-sixties: a) Inclusion of management automation projects into the preliminary design and planning process meant conceding the need for further prolongation of the time required for project documentation, which at the then sharp criticism of the excessive number of unfinished units under construction (which is still raised today, among others) was not politically acceptable; b) Inclusion of management projects delivery as an obligation meant conceding the increased laboriousness of projects and undertaking an adaptation of the JCPP (uniform schedule of prices for project operations) which was then recently agreed upon and published and on which all planning activities were based. (A contributory factor to a certain extent was also the fact that planning of management systems was a new planning discipline without tradition and experience, in which final documentation processing still could not avail itself of efficiency promotion measures, so that the relative labor intensity of this part of projects would be disproportionately higher than the laboriousness of the remaining components of construction project planning). /Therefore, organized implementation of automated systems of management failed to materialize on that basis./

During the years of crisis toward the end of the sixties the whole set of problems received only little attention due to underestimation of the role of the plan, central management and emphasis on the self-regulatory role of the free market. Revisionist theories were based on misgivings regarding the possibility of overcoming economic problems by systematic application of the system of management and failed to recognize the value of computer technology as an effective tool to that end. /A new impetus toward implementation of automated systems of management did not come until the transition between the sixties and the seventies provided by Inorga on the basis of the results

of direct scientific and technical cooperation with Soviet partners./ At that time, implementation of automated systems of management in the Soviet Union was promulgated and controlled as a state program with institutional and logistical support. As a result, in 1973 the Federal Ministry for Technical and Investment Development published under Ref No 14243/73 the first methodical guidelines for development of ASRP [automated system of plant management] and, gradually, in subsequent years, also for other levels of management. The program for development of ASR [automated system of management], which in that manner started to take shape slowly but surely, was reinforced in 1973 by promulgation of a balanced system of computers and by applying control restrictions on imports from capitalist countries, when it was stipulated that all demands for computers must be documented by approval of the projected task. Work on a more thorough version of methodical guidelines for implementation of automated systems of management has been carried on since 1976. Nevertheless, it ought to be pointed out that the methodology for implementation of automated systems of management is not tied in directly with procedures prescribed in the area of capital investment, and also that institutional management and control in this area exceeds the capacity and jurisdiction of capital investment control. (Control takes the form of consultations through the system for administration of state and departmental tasks, via the UVVTR [Research and Technological Development Center] and sectorial centers for ASR, even if a more direct approach would obviously help improve the quality of management in this area.)

/Development of automated systems of management in the Sixth Five-Year Plan has already acquired the status of a state program and the plan pursues the objective of tying it in with the state plan at least through balancing computer inventory./

Current State

According to the "Report on the State and Utilization of Computer Technology in the CSSR for the Year 1980" published last year by the Federal Bureau of Statistics, as of 31 December 1980 the inventory of the entire national economy included 1,457 digital computers, 171 punch-card computers, 205 control computers, 434 analog computers and 7 hybrid systems. The increase in the number of computer installations in a rough outline for the fifth and sixth five-year plans is illustrated in the following table:

Dynamics of Computer Installation Growth in the CSSR in 1971-1980

Computer Category	Number of installations as of 31 Dec 1971 in %	Number of installations as of 31 Dec 1980 in %	Index yr 80:71
Digital	64.3	79.5	536
Punch-card	32.6	9.3	124
Control	3.1	11.2	1,577

In the course of the Sixth Five-Year Plan the number of computer installations increased to 167 percent, which means that the rate of increase in installations dropped in comparison to the period of the Fifth Five-Year Plan. /Data

on increases in capacity are not available, even though the importance of this indicator is sure to gradually grow in comparison to the number of installations index, particularly since a major part of computer systems is slated for modernization./

In the course of the Seventh Five-Year Plan it is envisioned to procure 494 JSEP computers (including their importation) and approximately 1,100 SMEP computers (imports not contemplated) for implementation of ASR. The current methodology of planning does not permit an educated estimate as to the numbers of computers to be imported from capitalist countries. Of the currently installed computers, 21.6 percent were imported from the West, which in financial terms does represent a somewhat higher share. Nevertheless, it can be assumed that in the Seventh Five-Year Plan preference will be given to importation of components rather than importation of complete systems. The principle for preference of fewer but better equipped systems has already taken root. (This is borne out, among others, also by the statement emphasized in the preceding paragraph.)

It can be anticipated that the new types of computers which are to be supplied to our users as part of the JSEP and SMEP programs will have performance characteristics which will make it possible, on the one hand, that they find wider application in the area of controlling technological processes and, on the other hand, that they promote the buildup of hierarchically connected systems. Their equipment with graphic display units will also facilitate their use in civil engineering operations. (However, the prerequisite for this is solution of the protracted problems with disks.) /Thus, there will also be a substantial increase in the spectrum of applications in ASR and will bring closer to realization considerations regarding implementation of regional information systems on the territorial principle/ (e.g., systems SEI, AFIS [expansions unknown], etc.) /and their connection to hierarchical systems built up on an organizational principle/--particularly to hierarchical systems of the medium link of management (particularly topical for the trust form). Implementation of systems on a sectorial principle is, for the time being, complicated by inadequate delineation of boundaries among them and their mobility. It can be stated that /the coming generation of JSEP and SMEP computers provides the possibility of connecting them not only into the process of data processing for management, but also into the information exchange process./

Making full use of the current potentials offered by computers is limited on the one hand by the still lagging procurement of disk units and, on the other hand, by the capability of users for interactive operation with them. With the ever-increasing capacity of computer systems and growth in the number of their installations, in the coming years it will be necessary to expand their base of software and its generation, i.e., transfer a substantial part of this effort from programming specialists to qualified users. Herein we must follow not only the path of creating reproducible algorithmic modules, but also the path of creating conditions for controlled compilation of programs (via the display unit of the terminal and by means of programming tools of the type editor, program generator, etc.). Program libraries traditionally have at their disposal reproducible modules of algorithms for various mathematical methods. The current capacity of computers handle even complicated

calculations based on these methods without any problems. Thus, their application in ASR is limited by methodical problems, i.e., the capability of users to make effective use of them in analysis of phenomena and in decision-making processes. Wider use of graphic representation of data is another area that must be utilized more by users. The immediate result is saving of tons of paper.

Microelectronics further promotes those properties of computer systems that are oriented toward further substantial widening of the base of their applications in management; on the one hand, by miniaturization which does away with structural and energy problems which were an accompanying problem of computer use and, on the other hand, improved adaptability due to configuration by transforming current computer components into compact parts, and also by further increases in capacity, all of these with a positive economic impact in both the production and the user sphere.

Introduction of computer systems into the national economy is not regulated by the plan, it is merely limited by economic tools. No priorities have been set in regards to gradual vertical and horizontal interconnection of systems. That means that imported computers are obtained by enterprises that do final processing of goods for exports, financially strong organizations and such, regardless of whether, from the viewpoint of the needs of the national economy, it involves a vital enterprise and, to a certain extent, without regard to the ultimate impact. The concept of implementation of automated systems of management for the years 1981 through 1985 is shown in the following outline of departmental intents in regard to implementation of ASR at individual levels:

ASR Category	Implemented earlier in %	Implemented in 7th FYP in %	Total in %
ASR of production	7.3	1.5	3.3
ASR of medium level	7.4	1.8	5.5
ASR of enterprises	77.6	44.1	66.1
ASR of technological processes	10.7	52.6	25.1
ASR total	100 [sic]	100	100

The balance and concept for production of computer technology in the Seventh Five-Year Plan are essentially based on the assumption that ASR for the above-listed departmental intents will be met for the most part by a single computer system. However, the balance and concept of computer technology production for the Seventh Five-Year Plan do not precisely reflect the demand for modernization of computer systems. Technical equipment by external disk memories forms an exception. There is a consensus that users' needs cannot be met by memory capacities included in the so-called "basic configurations" (i.e., for computers EC 1025 2x100 MB disks, for computers SMEP only 1 to 2 casette disks). /Whether the intents for implementation of ASR in the Seventh Five-Year Plan are covered by design capacities has not been verified./

From the structure of departmental intents it follows that the focus of ASR implementation consists in implementation of ASR of enterprises and ASR of

technological processes. /Departmental intents obviously do not reflect the new role of the medium level of management/, particularly the new role of concerns.

The problems of automation of construction operations also, for all practical purposes, are not reflected in departmental intents. (Concerns take over, e.g., the role of the basic accounting unit--for example, Prum accounting records are kept by concerns and not by the concerns' organizations, several other economic activities and functions of organizations are being concentrated into the concerns as well, which underlines the need for implementation of ASR in them.) It further follows from the structure of departmental intents that only part of the contemplated production of SMEP computers in the amount of 1,100 units in the Seventh Five-Year Plan will be used in the area of ASR of technological processes and that the difference, i.e., approximately 600 computers of this series will have to be used in support of implementation of ASR of enterprises. Of course, that means a new concept of their "basic configuration," particularly as regards their equipment with medium-capacity disk units.

The current activities of institutions authorized to direct implementation of ASR are oriented primarily toward devising of standardized procedures and unification of efforts. They are not directed toward promoting efficiency in system design. These institutions are not adequately equipped to handle the latter task for the time being. /At departmental level, the function of "sectorial center for ASR" was delegated for the most part to various institutions and organizations as another associated function./

Conclusions

A considerably extensive program of implementation of ASR was launched in the CSSR during the Sixth Five-Year Plan. It will be further expanded in the Seventh Five-Year Plan. The technical means for this program are for the most part already provided from the production of socialist countries. Its backup by design capacities has not been verified. For the time being, the program is not oriented toward integration of the ASR being implemented. The activities planned in this area are already backed up by an innovated generation of methodical and normative documentation, but pressure on efficiency in systems design is lacking.

8204
CSO: 2402/50

BRIEFS

INTERNATIONAL SESSION ENDS--The 18th Session of the Council of Plenipotentiaries of the CEMA's Interretalonpribor Scientific-Production Association, attended by representatives of meteorological stations from Bulgaria, Cuba, Hungary, the GDR, Poland, Romania, the USSR and CSSR, ended on 21 May in Bratislava with the signing of a protocol. The session discussed possibilities for further expanding mutual cooperation in research, development and production of standardized precision equipment for measuring various quantities. [Prague RUDE PRAVO in Czech 22 May 82 p 2 AU]

CSO: 2402/56

INSTALLATION OF MORE MINICOMPUTERS URGED

Budapest HETI VILAGGAZDASAG in Hungarian 5 May 82 p 11

[Article by Otto Lendvai: "From Its Head on Its Feet"]

[Text] Our series on microelectronics inspired Otto Lendvai, department head of the National Nuclear Energy Committee, to write to us. In this article, we pass on to the readers his letter sent to our editorial office.

The mass appearance of minicomputers on the markets of capitalistic countries created a qualitatively new situation. The operating memory and speed of such a computer is greater than those of a computer regarded as a large in the middle of the 1960's by domestic standards. Just using the softward packages which can be ordered along with the system, we can perform complicated computations from bookkeeping to personnel record keeping and documentation. The machine can be connected as a terminal to some large data bank during its idle period. The machine can be used in the autonomous mode whenever needed. It does not depend on the operating schedule of a central machine. It does not depend on a data transfer infrastructure, which is extremely backward and unreliable in our country. It would take a monstrous economical effort to make this network satisfy the complete data transfer of centralized computer systems.

Based on the "mysterious" activities of certain people, the computer becomes a real typewriter, telephone or automobile. Be the language used BASIC or PASCAL or even higher level one, the small machines are directly used by those who had the trouble of having to do without them in the past. And they program them more ane more themselves (or adapt the programs chosen by them). This touches the lives of hundreds of thousands or millions. There is an alarm in the capitalist countries: the machines will displace the people. Should we also be afraid? Not at all, since t has been discovered that computers used in management and data processing hardly displace any of the work force, but rather improve managerial efficiency. If there is anything we need at all, we definitely need that! And if we have anything to fear, we should fear the lack of that.

In Hungary, the way to the future is still visualized through the development of large data networks. Let us ignore the expenses of the mentioned infrastructure for a moment; the matter is also irrational because most of the capcity of a computer performing several parallel tasks is taken up by "housekeeping" tasks: the separate running of the various tasks, the separation of their data and even the proper billing of computer time.

The program systems of large computers are complicated and difficult to learn precisely because of these requirements. The programmer following his own ideas is placed between the user and the performance of the task. If some of the basic ideas of the program turn out to be faulty during implementation, it becomes extremely difficult to correct the fault; under any circumstances, more difficult than when the programs are structured in blocks that are better adapted to the memories of smaller machines. The preparation and testing of large programs takes much more time than those of program segments.

The individually owned small machine not only makes the performance of the work faster. Even a smaller and slower machine is faster if one does not have to wait for a line or for the night-time processing of data and to find out about errors until the next day. The machine waiting for work attracts smart people in contrast to the network where every minute must be paid for--machine use and line use. Direct access to the machine makes one disciplined and demanding. But this is not the case when one has to deal with a "stupid computer center" which cannot do anything with the inaccurate data submitted.

Do not misunderstand me: I have no objection to large machines and the appropriate processing networks! But trains are one thing, and cars another. While "mass motorization" is under way elsewhere in the world, in our country, we are involved with the exclusive building of "railroads." "We", i.e., technical experts involved with the national computer technology, who fundamentally influence higher level economical decisions. And the national electronics industry.

I do not deny it, it is possible that our regulatory system places the industrial companies in jeopardy in this area. The national industry charges well over a million for a system (with one and a half year delivery time) which is retailed over the counter by companies in the west for 5500 dollars, complete with softward and at dropping prices. The national industry turns out a dozen of these, while capitalistic companies mass-produce them turning out 10,000 per one month. While in our country, companies are becoming more often capable of holding the price of four-operation pocket calculators at 8500 forints, they blocked the smuggling of machines sold in the west for one or two dozen dollars with "swords of flame" at our borders.

One of the key questions of the truly troubling problem is this: across the border, work is done using these tools, while we are continuing to use the old methods. In my subjective opinion, relatively speaking we are farther behind now than we were ten years ago--and the disadvantage is increasing.

The concrete suggestion: in order to participate in a data processing network, the user needs a terminal. A decent modern terminal is hardly different from a small computer. Let us put the order of things from its head on its feet! According to the current concept, the way to the expansion of the user circle is: one (or more) terminal per user, a computer center and a data transfer network. We have little money and the pace is slow. Let us take the following path instead: one (or more) microcomputer per user--this way the user circle can be expanded much quicker. And later on the small autonomous machines can be expanded much quicker. And later on the small autonomous machines can be used as the terminals of the large data processing networks! But to achieve this, industry must be made interested, and our import policies must be shaped accordingly.

9901
CSO: 2502/75

NEW DATA PREPARING SYSTEM: ORDAS-ORION

Budapest SZAMITASTECHNIKA in Hungarian Feb 82 p 5

[Article: "ORDAS-ORION DATA SYSTEM"]

[Text] Recently several articles have been dealing with the national situation of data preparation and the plant organizational and hardware and software problems connected with it in the columns of SZAMITASTECHNIKA. These articles revealed the problems of large-service computer centers--SZUV, FUTI--but everyone attempting or forced to handle bookkeeping tasks in his company using his own computer is faced with the same scope of problems. With the decreasing of computer hardware prices today this is possible not only for large enterprises but medium-size and small companies, production and industrial cooperatives and small service companies as well.

Since our company, the ORION Radio and Electronics Enterprise, has been processing commercial orders and production preparation with its own computer for several years, the design used by us may be of general interest in our opinion. Not only because in the present situation this can be considered optimal for small and medium-size companies, but also because (being primarily a manufacturing enterprise) we have developed the data preparing portion of the system in a marketable form bearing the name ORDAS-ORION and exhibited it at the 1981 spring Budapest International Fair.

The production preparation of ORION has been based on small computers (the TPA/i machines of KFKI) right from the outset. In the beginning, we were using one computer, now two and the multiprocessor system developed by their connection. The conventional data input of TPA machines was accomplished via a console in the case of small amount of data, and via punched tape in the case of large amount of data. Thus, in the beginning, data preparation, i.e., the conversion of data into a machine-readable form, the preparation of punched tapes from the numeric and character certificates was done via teletypes. This design, however, had to be soon "bailed out" by more modern data preparation. This had ergonomic (noise: ear damage) and technical and economic reasons. The error rate of electromechanical devices is high; the checking and correction of punched tapes is difficult. Since it cannot be done visually, it takes advantage of the computer and must be handled with care (is easily torn). Furthermore, with time, the electromechanical devices became used up, their maintenance costs quickly increased, and the continuous provision of data preparation was causing more and more problems.

The application of screen devices manufactured in-house offered the obvious solution for data preparation. At the time, the common characteristic of the screen data preparation systems, so-called key-to-disc systems, appearing in the west was that the character by character treatment of the data, resulting from the use of the simple displays, put an extreme load on the computer. In the beginning, we connected an in-house manufactured ESZR terminal (ESZ 8564), much more "intelligent" than the aforementioned displays, to the TPA/i mini-computer. This terminal made the screen units independent from the computer, and relieved the machine from controlling the screens. This, of course, was a redundant design, since a significant part of the capabilities of the terminal developed for a large computer was not necessary in this application, but the system developed in this manner satisfied our in-house requirements and offered the opportunity to develop an effective software. Even at this stage of the development, the idea came up that it would be worthwhile to develop a product from this system. Thus we developed a group screen control unit which can be built into the computer, instead of developing a terminal control unit. This unit functions based on a M 6800 microprocessor and acts as a concentrator.

Next, let us review the services and structures of ORDAS.

ORDAS is an 8-work station key-to-disc organization data preparing system. The work stations are CRT screens with alphanumeric and numeric keyboards. The data recorder at the work stations performs the following tasks: data input, data checking (verification), correction, modification.

DATA INPUT

The 8-data-input terminals available in the system offer the possibility of the simultaneous entering of data according to eight different formats. Naturally, any of the available operating modes (data input, checking, correction, modification) can be simultaneously activated on the individual screens.

The data input mode offers the possibility of creating new data files and the expansion of the already existing data files.

CHECKING

This assures the rerecording of the records of the already existing data file according to the format. It compares the actual record contents to the contents displayed on the screen and sets the error bit in case of divergence.

CORRECTION

Based on the contents of the indicator bit assigned to the records of the data files, this operating mode searches for the faulty data records, corrects them and reenters them into the data files.

MODIFICATION

This operating mode searches for any desired record of the data file, changes it and reenters it into the data files, independent of the value of the indicator bit. The removal or editing of records is also possible.

Thus, through the effective use of the services offered by the system, faultless data files can be created on the disc. These files can be used by the user in several ways:

--in the case of smaller files, the system can process them as a stand-alone computer;

--the system can provide an off-line connection to a large computer by recording the data in IBM/ESZR and DEC/MSZR compatible format onto magnetic tape;

--by an on-line connection, via a modem, the system can be connected to another computer which performs the final processing of the data.

(The structure of this goal system is shown in the figure.)

Individual hardware elements:

--CPU: TPA-L 12-bit microprocessor computer;

--operating memory: 32 K words;

--background storage: 1 cartridge disc unit, with a fixed and a replaceable disc (7 M word capacity), 1 DISCMOM fixed drive magnetic disc storage (256 M word capacity);

--consoles: ADP-2000 alphanumeric screen unit 24 lines X 80 characters screen format;

--hard copy: DZM-180 (or Robotron 1156) dot matrix printer;

--data recording work stations: 8 ADP-2001 alphanumeric screen units with an 84 X 80 character screen capacity, with numeric and alphanumeric keyboards;

--optional units; background storage: 1 or 2 magnetic tape units, ESZR-MSZR compatible; on-line connection: synchronous or asynchronous line transmission, up to a 9,600 bits/s rate; modems; AM-1201, AM-12TD, 1,200 bits/s.

Software elements of the system:

--OS/i general-purpose operating system,
--OS/i editor programs (editor, etc.),
--OS/i FORTRAN-II, high level programming language,
--MIDIBOL, SORT, SELECT bookkeeping-oriented programming language,
--RTS/i real-time operating system,
--ORDAS program package, oriented toward data preparation.

What are the advantages that make this system the optimal design for small and medium-size companies?

Data preparation takes up 20-25 percent of the capacity of the central unit. At the time of the data preparation, with the remaining 75-80 percent, the configuration can be used as a general-purpose computer with certain limitations, in the OS/i operating system. When there is no data preparation, the

system can be used as a general-purpose small computer within the limitations of the hardware which however, can be expanded (replace the dot matrix printer with a line printer, for instance).

The flexible handling of data is greatly enhanced by their two-fold formatting: independent input and output formats.

It takes maximum advantage of the autonomous features (independent storage, text editing, protected fields) of the ORION ADP-2001 CRT alphanumeric screen units, and thus relieves the computer.

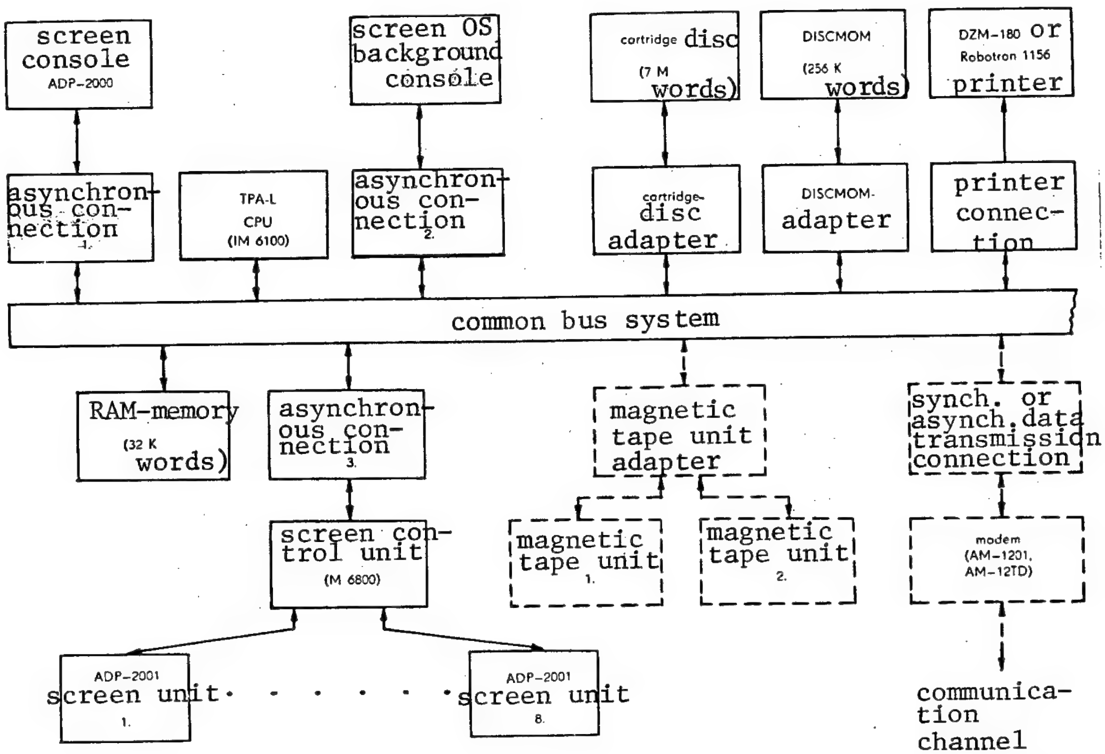
To protect against power failures or similar faults, the system protects the data files in such a way that at most 5-minutes worth of data-preparation data are lost during such emergencies.

The configuration of the system permits the positioning of screen units within a 1,000-meter distance. Thus distributed processing tasks can also be implemented.

--With the help of the on-line connection, the ORDAS system can also be used as the satellite subsystem of a large computer. The hardware configuration permits both synchronous and asynchronous connections. The hardware required for this can be optionally shipped with the system. The software necessary for the connection has not been created, because this must be configured according to the needs and capacities of the users (according to the type of the machine performing the further processing)--we are willing to accept responsibility for its development on a case-by-case basis.

The other significant relationship has to do with the optional magnetic tape unit. In our present system, we are using ZMB 51 magnetic tape devices manufacutred in the GDR, but these can no longer be regarded as state of the art. KFKI developed the MSX model magnetic tape device which has excellent features. This device will be manufactured by ORION; it can, of course, be ordered independent of the ORDAS system.

Those wishing to become more familiar with the system or observe it in operation for the purpose of gaining preliminary technical information can get in touch with the factory computer center.



ORDAS-ORION Data Preparing System

9901
CSO: 2502/77

TECHNICAL-ECONOMIC COMPARISON OF MULTIPLEXORS

Budapest SZAMITASTECHNIKA in Hungarian Feb 82 p 4

[Article by Janos Sved: "Technical-Economic Comparison of Multiplexors"]

[Text] Finally the Hungarian remote data processing (TAF) user--or rather future user--reached the stage where instead of having to cope with the shortages which characterized the 1970's, he is offered some choices. In this article, based on technical-economic considerations, we should like to assist him in making a choice. The article examines exclusively multiplexors available in Hungary and in the socialist countries and which are stocked in our country. Even from these, we shall concentrate on those which are either already operating in some installations or are included in the purchasing plan of SZAMALK. Thus we shall not deal with IBM multiplexors and communications drivers 3704 and 3705, since there are examples for the connection of the IBM machine and the Hungarian multiplexor. We shall not deal with the Bulgarian MPD-1 (ESZ 8401) and the MPD-4 (ESZ 8403) GDR-made multiplexors which, according to our knowledge, are not included in the long-range plans, although there is one or two of these in the country. We shall only briefly mention the ESZ 1010 based Videoton multiplexor, which is known by the trade name VT 55000. The production of this has been canceled with the cancellation of the production of the ESZ 1010. The configurations in Hungary have significant differences, and thus comparisons with other multiplexors are difficult.

We shall deal with three devices in detail: the MPMX-51 multiplexor developed by SZKI, the Polish ESZ 8371.01 device and the TMX 2410 (ESZ 8410) of the Telephone Factory.

SZKI designed its multiplexor to alleviate a shortage and wishes to produce a total of 15 of them. It completed production by 1981 and forwarded the further requests to the Telephone Factory.

The SZKI multiplexor can serve a maximum of 16 lines, from which a maximum of 4 can be synchronous. On the synchronous line, it handles IBM BSC, on the asynchronous, IBM 2740 procedure. The device can be connected only to one computer; it does not have a two-channel switch. Its price varies (depending on the expansion) between 2 and 3 million forints. The expenses of the installation to the software environment must be added to this; this is also handled by SZKI. The guaranteed servicing of the device is also performed by SZKI.

The ESZ 8371.01 designation device which is the backbone of the Polish Tele JS and is equivalent to the IBM 3705 is distributed by SZAMALK. This network controlling processor emulates conventional multiplexors (IBM 270X); in addition it can be used in a network controller operating mode (using IBM terminology, via an NCP program).

The device installed by OSZV (its legal successor is SZAMALK) is currently used in the emulator operating mode, in the ESZ 1055 environment. The network controller program will be shipped by the Poles in the near future; in addition, SZAMALK is making an effort to install the NCP with an expansion of the operating storage to 256 kbytes, using a nationally developed semiconductor storage.

The 8371.01 network controller processor can serve a maximum of 352 lines, with the aid of SS, BSC/SDLC line protocols in the 50-39,000 bps transmission range.

The equipment is recommended primarily to users having larger central resources (mostly users of the second series ESZR systems 1035, 1055) and desiring to operate a large capacity terminal network with a multiplexor, network controller or a combination thereof. In these applications, of course, the presence of access methods (TCAM, VTAM) providing a connection with the network is required in the operating system and the activation of dialog (TSO) systems and that of TAF monitors (CICS, SHADOWS, etc.).

TERTA started the production of the TMX 2410 multiplexor. (The device was introduced in the November 1980 issue of our magazine.--The Editors.)

So far, we have produced about 60 of them; most of these were exported. Until now, six have been installed in our country with various ESZR and IBM 370 computers. The terminals served include the IBM 3270, the ORION AP-62, 64, the Videoton VTS 56100, VDT 52104, the TERTA TAP-2, TAP-70 and TAP-34 and the Polish ESZ 7910 terminals.

The price of the basic configuration of the system is 876,000 forints for 1 line. The basic configuration can be expanded to 32 lines; the price of the expansion is 24,000 forints/line. Terminals with various algorithm and speed can be combined in the configuration. TERTA also takes care of the installation of the TAF subsystem, which works together with the multiplexor, to the software environment required by the user.

Some Data of Multiplexors

Type of Multiplexor	MPMS 51	TELE JS ESZ 8371.01	TMX 2410 (ESZ 8410)
minimum number of lines	16	(64) 352	32
types of terminals saved	IBM BSC (on a maximum of 4 lines)	IBM BSC elements of the ESZ 7900 terminal family	IBM and ESZR BSC
	VT 340 (as an IBM 2740)	ESZ 8575	TAP-2 TAP-3 TAP-70 TAP-34 AP-62 AP-64 teletypes
price of a minimum configuration (in forints)	2 million	3.7 million	0.9 million

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R&D TASKS OF COMPUTER NETWORKS

Budapest SZAMITASTECHNIKA in Hungarian Feb 82 p 3

[Article by L. CS.: "R&D Tasks of Computer Network Systems"]

[Excerpt] Network goal task 51 involves the national development and introduction of a new remote data processing system and device generation.

We shall describe the main research program to be implemented during the Sixth Five-Year Plan within the framework of SZKCP goal task 51.

The tasks can be divided into five groups related on several points.

--The problem of the public postal data network connection. Within this, the primary task is the preparation of the packet-switched service.

--The cooperation in the development of the next remote data processing (TAF) generation of ESZR, whose goal is the development of the open network architecture of a single and multimachine ESZR.

--Network integration of ESZR-MSZR and other computers. By the application of the aforementioned standard concepts, a hardware-software base must be developed, which, based on the postal data network services, allows the development of network sample and user systems consisting of inhomogeneous elements.

--The development of goal-oriented ESZR-MSZR minicomputer networks. Access to the services of large ESZR models via minicomputer networks.

--The development of local networks, access to the services of larger ESZR models via local networks.

Let us assume some of the interesting typical characteristics of these tasks!

As we know, the Hungarian Post opened its new line-switched data transfer network in 1981. Based on international experience, however, the introduction of packet-switched services also appears necessary. Packet-switch network services offer the possibility of handling parallel traffic, the coordination of the activities of computers operating at various speeds and the advantageous development of international network connections. Since network access

protocols are rather complex, prior to the introduction of the postal service, a rather intensive preparatory effort is needed both from the provider and the user of the service.

We are performing these preparatory tasks within the framework of goal task 51.

The preparation of the packet-switched network connection and the performance of traffic experiments is made possible by the packet-switched subnetwork of the MTA computer network.

The ESZR open network system (in its first developmental stage) is developed from a model system containing a processing computer, a Polish ESZ 8371 TAF processor, and an ESZ 1035 computer. This system offers the possibility of the testing and system integration of domestically developed ESZR network architecture terminals and TAF processors. During the implementation of the task, the development of a system containing several computers must also be handled. This can be done in part by implementing the connection to the packet-switched network and in part by the acceptance of the multi-machine ESZR software, i.e., by participating in the development.

The third task group (the development of the know-how of a network consisting of inhomogeneous devices) makes possible the complex network integration of ESZR and other machines which already exist but are incompatible with the ESZR network architecture.

Based on the ESZR-MSZR common network concept of socialist countries, we shall participate in the development of standard architecture and the preparation of the hardware-software implementation during the effort.

The goal is to complete by the end of the Sixth Five-Year Plan the production of a few network systems operating on this principle and to place them in operation.

A part of the requirements presented in the peoples economy is relatively narrow and goal-oriented but requires a complete network service in the given area. Such demands are best met by a network developed from mini- or mega-minicomputers. This approach offers the opportunity of the sensible minimization of the functions of the protocol levels, but at the same time it is necessary to implement all protocol levels needed for the given application. Thus the objective of the task is the establishment of goal-oriented minicomputer networks which satisfy the requirement of a closed user circle (e.g., production management of the enterprise).

The development of local networks in the past 2 years is highly visible.

With the help of the physical connection allowing rapid mass data transfer, the computer resources located at a limited distance can be integrated into a unified network system, a so-called local network.

The primary goal of the development is the creation of a high-speed data network. During the development of the architecture of the local networks, special attention must be paid to the compatibility of the higher level protocols of the systems mentioned earlier and that of the devices used to implement the

prototype. In addition to the integration of the ESZR-MSZR computers, the requirements of the devices needed for office automation must also be satisfied.

It is our hope that even this brief description will be sufficient to provide an overview of the high-volume and multifaceted research activity planned for the period between 1981-1985. Nearly all national institutes involved with this subject participate in this project; the most significant effort is being made by MTA SZTAKI, SZKI, KFKI, SZAMKI (its legal successor: SZAMALK), BME HEI, the Hungarian Post and Videoton.

The research is financed by OMFB, MTA, the Ministry of Industry, the Hungarian Post, KSH and Videoton.

Applications in the peoples economy will be provided by the agreements reached between the developers and the national manufacturers (Videoton, TERTA), moreover OSZV (its legal successor: SAZMALK) which is the primary entrepreneur.

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REMOTE DATA PROCESSING PROBLEMS EXPLAINED

Budapest HETI VILAGGAZDASAG in Hungarian 5 May 82 p 12

[Article: "GOLEM in Hungary"]

[Text] Life is not easy in Hungary for those technical experts who are involved iwth remote data processing, the development and operation of remote computer networks. Neither software nor hardware conditions are favorable. The domestic telephone network is often incapable of handling simple phone calls, let alone data transmission requiring a much higher level of reliability. Furthermore, the national organizers of micro-electronics are faced with a low level computer culture and a lack of a receptive attitude.

In spite of all of this, a few computer networks are already in operation in Hungary. From the technical viewpoint (by national standards), one of the most modern one of these is DATORG, the network of the Hungarian foreign-trade organizational enterprise. At the present, 40 terminals are connected to it; among them, 18 are located at various sites in the capital (mostly in foreign-trade enterprises), and one temporarily in the Dobogoko Management Training Center.

Foreign trade enterprises, which have DATORG, directly transfer their data to the central foreign-trade data bank and can access information in it at any time. They can take advantage of such systems as the GOLEM textual data-base management system, which is suited among other things for the development of management information systems (based on it, managers can receive up-to-date information on tasks assigned by them earlier) or the preparation of mailing lists and the proper classification of the addresses (HUNGEXPO organizes its exhibitions on a system like this; its own terminal even addresses the envolopes, using the information received from the central machine). Several foreign-trade enterprises, also using the central machine, prepare via remote terminals a price information system for COMECON price negotiations which contains all information necessary for the generation of the price five years back.

According to the experience of DATORG, many foreign-trade companies do not even take advantage of this system which has rather limited technical possibilities compared to the capacity of large computer networks in the west. Although during the past years, even the national industry produced some encouraging results in the production of computers and peripheries which can be also used in remote data processing systems. The video screen terminals of VIDEOTON are suitable for a simpler connection to the large computer; the equipment of Telephone Factory even have their own memory, and thus their intelligence can be shared with the central machine; a magnetic tape memory can also be connected to the equipment of VILATI. The small VIDEOTON computers which can also be used as stand-alone computers fit easily into the remote data processing system.

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BRIEFS

FIRST R-60 COMPUTER OPERATION--A ceremony for officially putting the first R-60 computer into operation in Poland was held at ZETO [Main Center for Electronic Computer Equipment] in Katowice on 2 September 1981. This computer, which is the largest RYAD series model being currently produced, provides the capability of substantially increasing the capacity of the current computer equipment and consequently to increase considerably the computing potential of the Katowice center. The importance of this fact was stressed by the participation in the ceremony of not only high-level representatives of the Ministry of Science, Higher Education and Technology, provincial authorities and major users of ZETO in Katowice but also the representatives of the R-60 producer's higher management, Polish and Soviet branch foreign trade agencies and the commercial department of the Soviet embassy in Poland. [Text] [Warsaw INFORMATYKA in Polish No 1, Jan 82 p 25]

CSO: 2602/20

EMIGRE SOURCE DISCUSSES NUCLEAR ENERGY PROGRAM

Paris BULETIN DE INFORMATIE PENTRU ROMANI IN EXIL in Romanian 1 May 82 p 2

/Article by Grigore Filiti: "Romania's Nuclear Program"7

/Text7 The plans drafted by the RCP Central Committee called for construction of 12 nuclear electric power plants by the year 2000 totaling 10,000 mwe (1 mwe = 1,000 kwe, or kilowatts of real electricity, the installed thermal power being much greater) of the 180,000-200,000 mw entered back in 1973 in the energy program for the last quarter of the century.

Negotiations with Canadian firms specializing in constructions in developing countries led from reduction to reduction to the purchase of only four 660 mwe reactors of the CANDU type, which permit use of the natural uranium available in Romania. The first plant is under construction at Cernavoda, where the Danube will supply the nenecessary cooling water. On 31 March 1982 the Plenum of the Central Committee decided to purchase a fifth reactor for the power plant, which will make it one of the most important nuclear electric plants in the world.

The Romanian government asked an American-Italian consortium to deliver two reactors with an installed power of 700 mwe, the contract amounting to $320 million. These reactors will be installed in a plant in Transylvania similar to the one at Cernavoda, and one or both units are to be placed in operation by 1990.*

On the other hand, within COMECON Romania is contributing to the construction of the Yuzhno-Ukrainsk (formerly Konstantinovka) Nuclear Power Plant and also to the installation of the Soviet-Romanian-Bulgarian high-voltage power line, which will distribute the current produced by that power plant to Romania and Bulgaria.

This kind of cooperation with the USSR is preferred by Ceausescu, under the pretext of the delays in building the power plants in Romania. It results in an even greater economic dependence on the USSR.

The delays are apparent and understandable upon analysis of the difficulties encountered. The CANDU (Canadian Deuterium-Oxide Uranium) channel started in 1967 with one

*A third power plant, located in Moldavia, will be equipped with three 1,000 mwe reactors, one of which will be in operation in 1990.

200 mwe reactor and gave rise to a series of 16 other units of 500-750 mwe capacity in operation in Canada (but also in other, developing countries).

The difficulties presented by the CANDU channel are, first, the price of heavy water (deuterium oxide) used as a moderator and a coolant. One 660 mwe reactor requires 660 tons of heavy water at $100,000 a ton, or $66 million, which is nearly one-third of the total price of the reactor.

In the second place, the container of the core of the reactor has large dimensions, probably 12.50 m high, 16.50 meters in diameter and at least a 10 cm thickness of the steel. The welding of the cylinder and lids is very delicate. The core is inside a biologic case 60 m high, 30 m in diameter and with a 6 m thickness of precompressed barite concrete. And so, in the third place, special foundations are used because the whole unit weighs at least 70,000 tons. Moreover the power plant includes large buildings to house the turbogenerators and the rest of the technical installations, which may be common to several reactors.

The Central Committee's plan called for construction of more reactors when the earthquake occurred in 1978, which caused the Canadians to request installation of anti-seismic protection requiring a new and heavy expenditure of more foreign exchange. The consequences of the destruction of a reactor, with insufficient biologic protection for reasons of economy typical of the so-called socialist republics, were considered catastrophic, especially because the prevailing winds blow from Romania toward the USSR. This compelled the reckless RCP Central Committee to plan construction of nuclear power plants only in areas of weak or no seismic activity and to participate in construction of power plants on Soviet territory located on the Podolian plateau (possibly in southern Bessarabia) included in the integrationist plans of COMECON.

Note that only the reactors will resist a powerful earthquake, shifting a few centimeters, and the rest of the installations may be destroyed. A final difficulty with the CANDU channel is the needs for fuel. Every installed mwe requires 500 kg of metal uranium, or 3,850 tons for the present level of 7,700 mwe. The lifetime of a reactor is 30 years, and so the current output of uranium, /solely to resupply the power plants scheduled in 1982, is 130 tons, at a price that will rise as the lodes give out. We note that in Romania the uranium output is controlled by a mixed Soviet-Romanian company (SOVROM) and the statistics on it have always been secret.

In comparison with the channels in the West and even in the USSR, those in Romania will already be obsolete by the time they go into operation, since the new channels use enriched uranium and supergenerators that not only consume less fuel but even produce it. The USSR has an enriched unranium plant but it has difficulties with local deliveries. Romania's natural resources will continue to be despoiled.

Installed Power and Electric Power Output in Romania

Year	1970	1982	1990
Population in 1,000's of inhabitants	20,053	22,550	25,000
Annual output in 1000's of mwh			
a. Self-producers		3,800	4,000
b. Plants of Ministry of Electric Power		70,300	106,000
-Hydroelectric power plants	2,773	12,900	26,400
-Power plants burning coals	9,684	24,030	48,400
-Power plants burning hydrocarbons	21,579	31,820	5,000
-Power plants using reusable energy resources and new sources	947	1,550	5,200
-Nuclear power plants			25,000
Total	35,008	74,100	110,000
Per capita annual output in kwh	1,732	3,286	4,400
Per capita installed power in kw	0.363	0.764	1.299
Installed power in electric power plants of Ministry of Electric Power in mw			
-Hydroelectric power plants	1,200	3,861	9,357
-Power plants burning coal and bituminous shales		7,261	12,500
-Power plants using hydrocarbons, wood, solar and wind power, etc.	6,146	6,110	6,110
-Nuclear power plants			4,500
Total	7,364	17,232	32,467
Ratio of output to installed power (hours per year)	4,776	4,300	3,388
Use coefficient of installed power	0.547	0.491	0.386

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POSSIBILITIES OFFERED BY NEW 'INTERCOB' PROGRAM PACKAGE

Bucharest STIINTA SI TEHNICA in Romanian No 12, Dec 81 p 34

/Article by Dr. V. Peteanu/

/Text/ After more than a decade of use of computers in the economy it can be said that the vast majority of economic units in Romania are using automated data processing. But the two main characteristics of the electronic computer, its memory and speed, are only partially exploited because most of the processing is confined to organizing and handling large volumes of data or to making simple, repetitive calculations. Few data processing systems or applications of them employ modern mathematical methods, especially modeling and simulation, although it is modeling that can produce the most spectacular results in economically effective use of computers in the economy. The models, especially the operational research models, appeared at almost the same time as the first computers and still bear the stamp of those beginning years. They have notmade sufficient allowance for the impact of the computer upon economic thinking, they have evolved more slowly than computing equipment, and most of them are not adapted to the possibilities of teleprocessing and conversational operation.

The traditional model contains a great many variables, a set of restrictions, and an end function. An optimal solution is sought, that is the values the variables are to take in order to accomplish the optimal (maximal or minimal) end function while conforming to the restrictions. Such a solution is mathematically perfect but rarely satisfactory in practice.

Of course a model is a more or less approximate representation of a specific problem, and consequently the optimal solution of the model is rarely the best solution of the problem. And in practice an operator (or decider) is actually trying to accomplish several objectives and cannot sacrifice the majority of them in order to rationalize any one. Therefore models with several end functions were developed, and a good solution of the problem is a solution of the model that provides an acceptable compromise among the values of the end function.

The decider must cease to be a spectator provided by a computer with a solution of the model that he will apply as such. Using a computer and a model he, the decider, must construct his solution and must be able to modify it at will (within some objective restrictions of course) and to be a true author of the decision with the aid of

the model and computer. Accordingly the decider must be able to accomplish an intercorrelation of the objectives (INTERCOB) with a minimum knowledge of information science and modeling, and the resulting INTERCOB program, which is actually a package of programs, is an attempt to accomplish those aims.

The first version of the INTERCOB package was produced at the Cluj-Napoca Regional Computer Center in 1981. The package can be used at a distance, meaning that the decider can install a terminal in his office while the computer can even be in another locality.

The package appears at the user's request, i.e. it indicates how it can be used. It requires no knowledge of information science on the user's part and even directs him to improve the solutions in the INTERCOB process. The user establishes the set of objectives in which he is interested, as well as his preferences as to the level of each particular objective.

What happens if the INTERCOB package is used in planning, let us say? To be sure a number of restrictions will be imposed by the production capacities, the minimum quantities of each variety or group of varieties to be produced, the available raw materials and materials, funds, manpower, energy etc. INTERCOB provides a solution but indicates it only upon the user's request. But it does indicate the values of the objectives pursued (as for example the value of the gross output, the value of the net output, the extent of the outlays, productivity, profit etc.) The user can request another solution reflecting preferences as to increasing or reducing the values of some objectives and keeping those of other objectives within certain limits. Of course the value of one objective will generally be improved by a compromise in the way of accepting inferior values for other objectives. INTERCOB calculates a new solution and provides new values for the objectives pursued. If these values are satisfactory the user can request the solution (the production structure). Otherwise he will formulate new requests concerning the objectives and the dialogue will continue. When a solution is obtained that is relatively acceptable but shows minor changes in the value of a given indicator, INTERCOB can supply upon request the list of resources that do not permit the desired change because they are exhausted. In this way the user can determine which resources would have to be supplemented and exactly how far in order to attain the desired value of the respective indicator. After the solution is finalized INTERCOB can supply upon request a list of the resources and the quantities that have not been consumed, and the user can decide upon their use for other purposes. This prevents accumulation of surplus stockpiles in the planning stage. Accordingly the operator has to deal with a small number of values with which he works directly, while the bulk of the information is handled automatically by the electronic computer. He can concentrate upon the major planning problems without bogging down in the mass of information and calculations.

The model can be expanded in progress by adding new resources and also by requesting manufacture of new products or increasing the output volume of certain items. INTERCOB analyzes the possibility of producing the requested new item and the user can start again with INTERCOB on the new terms. This facility commends the INTERCOB package as an excellent tool in contracting operations too, where it must be determined rapidly whether a new order or one supplementing the existing order is acceptable despite its effects upon some of the enterprise's economic indicators.

In order to place the INTERCOB package in operation, two stages must be passed that require a greater effort, namely specific determination of the model (restrictions

and end functions) and feeding the model with data (resources and specific consumption).

These tasks will be performed by a team of specialists in modeling and by the managers in charge of the necessary information.

Although the first version of INTERCOB was made for cases where the restrictions and objectives are linear functions, the package remains "open" in the sense that future versions can also be made that will no longer require linearity and the way the decider uses them will not be changed. Accordingly the decider (usually a manager) will use the next versions in the same way as the present one, and the changes in the model will be made solely by the specialists. The INTERCOB package will be available upon its approval at the end of a testing stage.

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END